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Kister

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(54) **REMOTELY OPERATED SUN VISOR**

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This patent is subject to a terminal disclaimer.

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Related U.S. Application Data

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(60) Provisional application No. 62/771,887, filed on Nov. 27, 2018.

(51) **Int. Cl.**
B60J 3/02 (2006.01)

(52) **U.S. Cl.**
CPC ***B60J 3/0226*** (2013.01)

(58) **Field of Classification Search**
CPC B60J 3/0217; B60J 3/0226
USPC 296/97.4, 97.12, 97.9, 97.13
See application file for complete search history.

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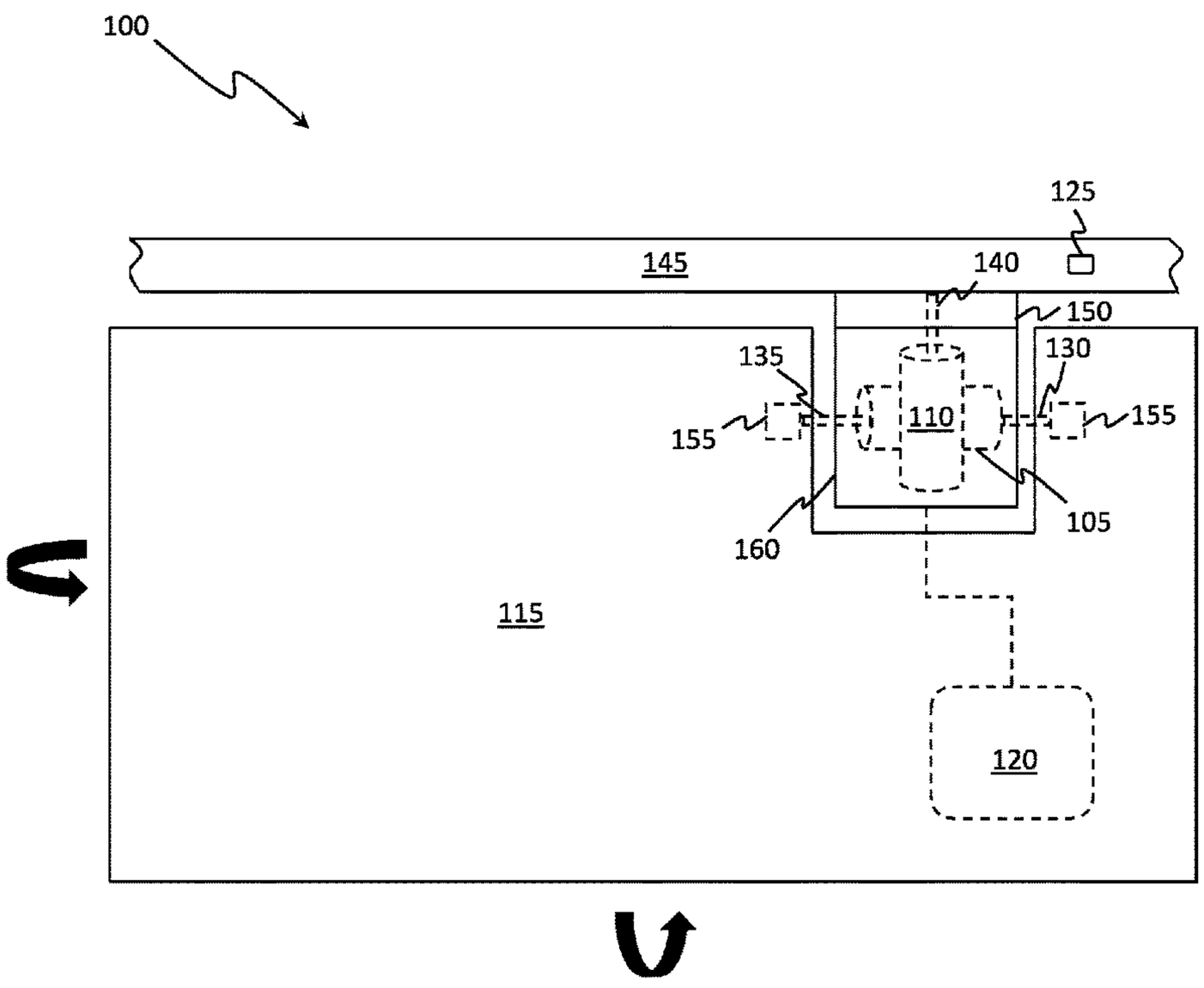
Primary Examiner — Joseph D. Pape

(57) **ABSTRACT**

A remotely operated sun visor is disclosed. The visor includes first and second rotational mechanisms, a sun visor body, controller unit, and power switch. The first rotational mechanism is affixed to and oriented perpendicular to the second rotational mechanism. The sun visor body is torsionally coupled to the first rotational mechanism which thereby rotates the sun visor body about a first axis when activated. The vehicle mounting plate is torsionally coupled to the second rotational mechanism, which thereby rotates the sun visor body about a second axis when activated. The first axis is oriented perpendicular to the second axis. The first and second rotational mechanisms are each communicatively coupled to the controller unit. The first and second rotational mechanisms are positioned within a motor housing. The first rotational mechanism includes a first rod and a second rod positioned opposite the first rod. The second rotational mechanism includes a third rod.

19 Claims, 11 Drawing Sheets



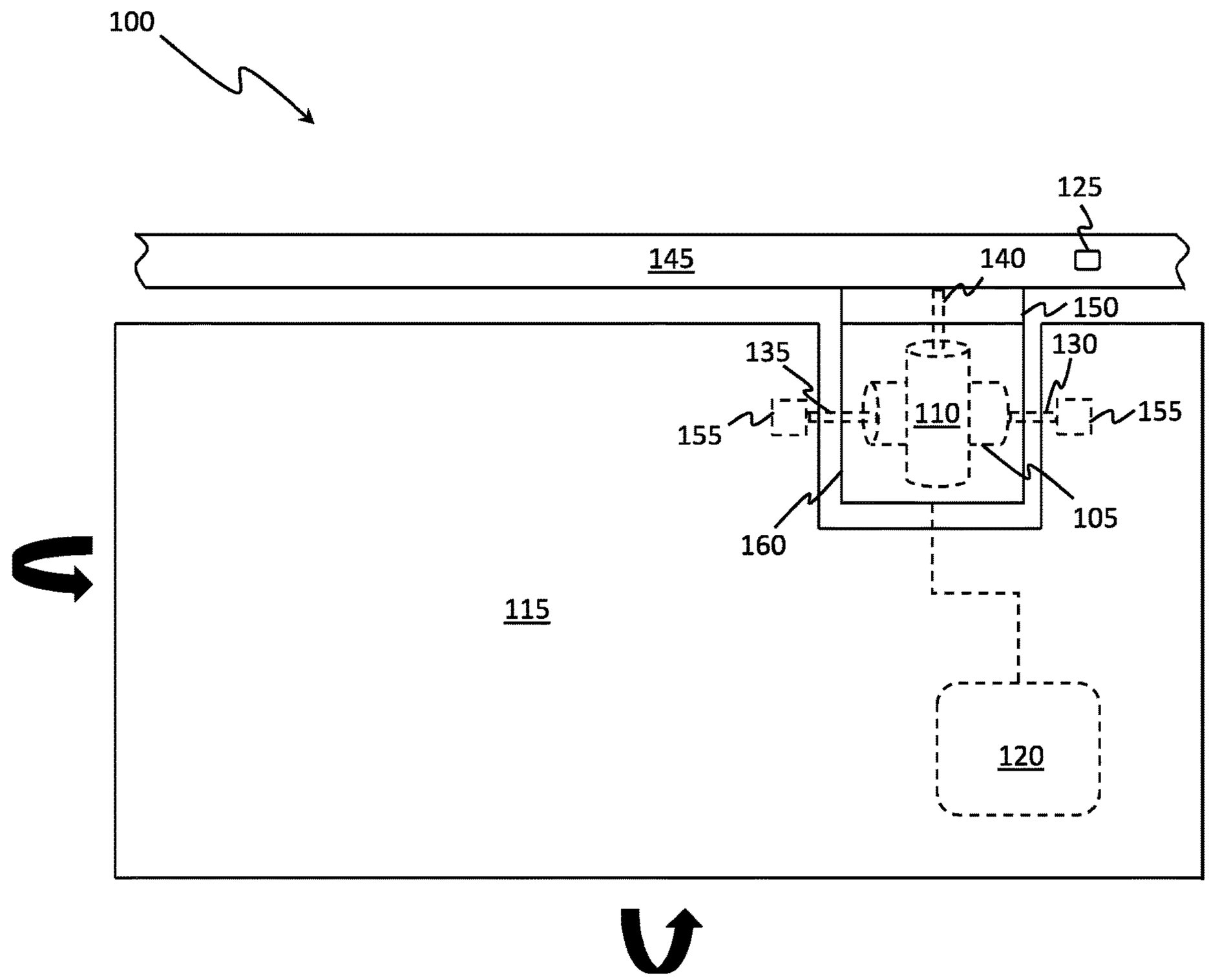


FIG. 1

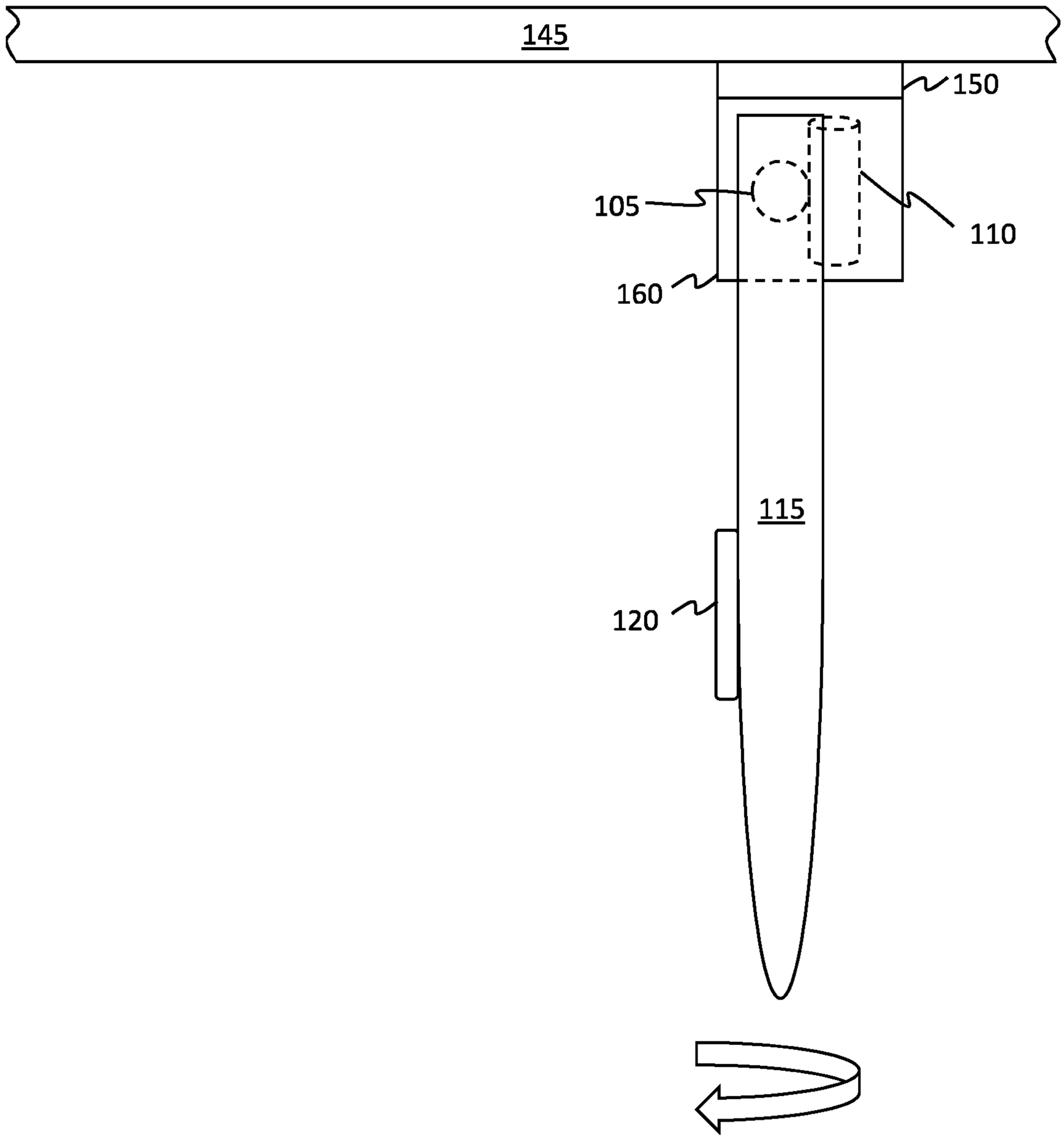


FIG. 2

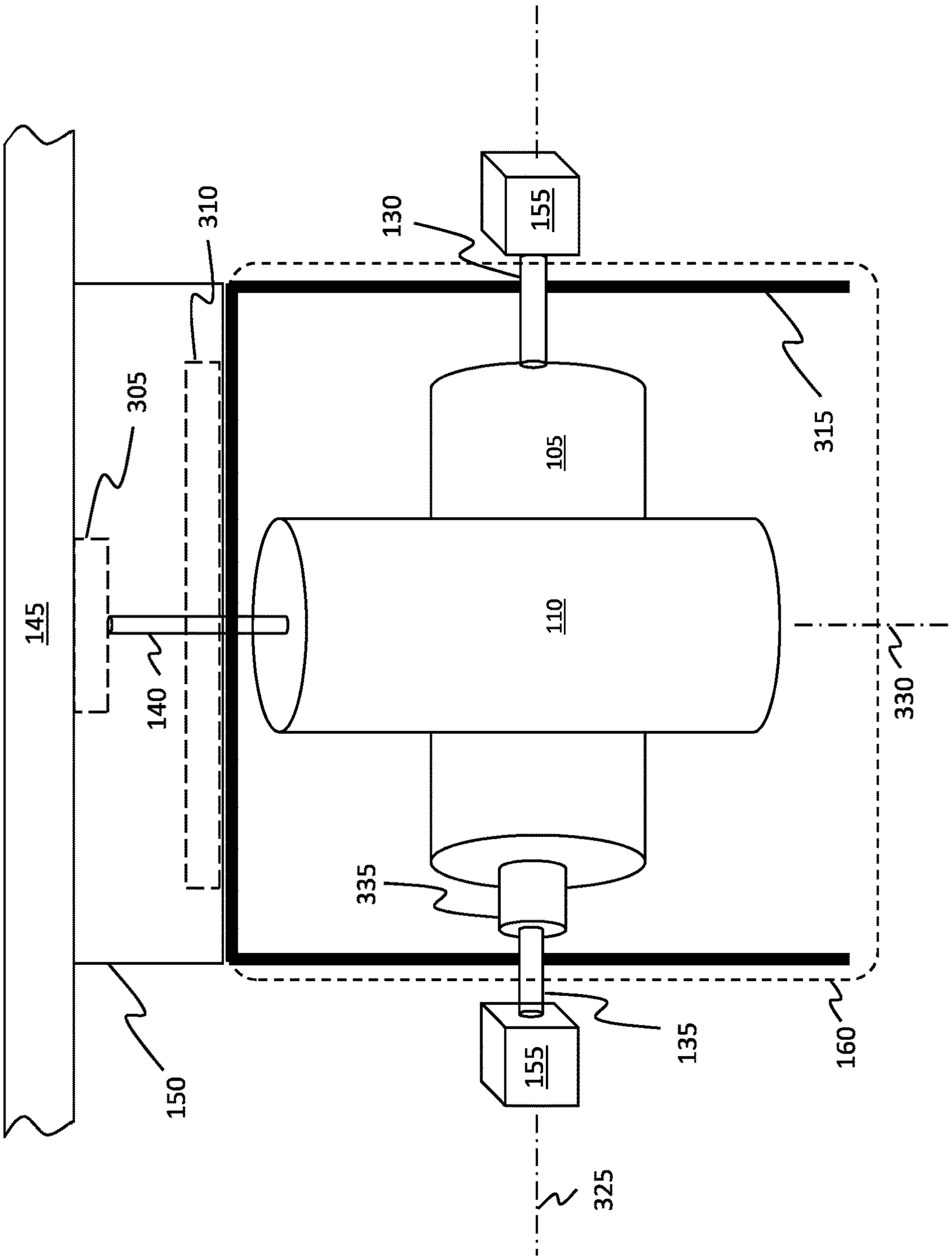


FIG. 3

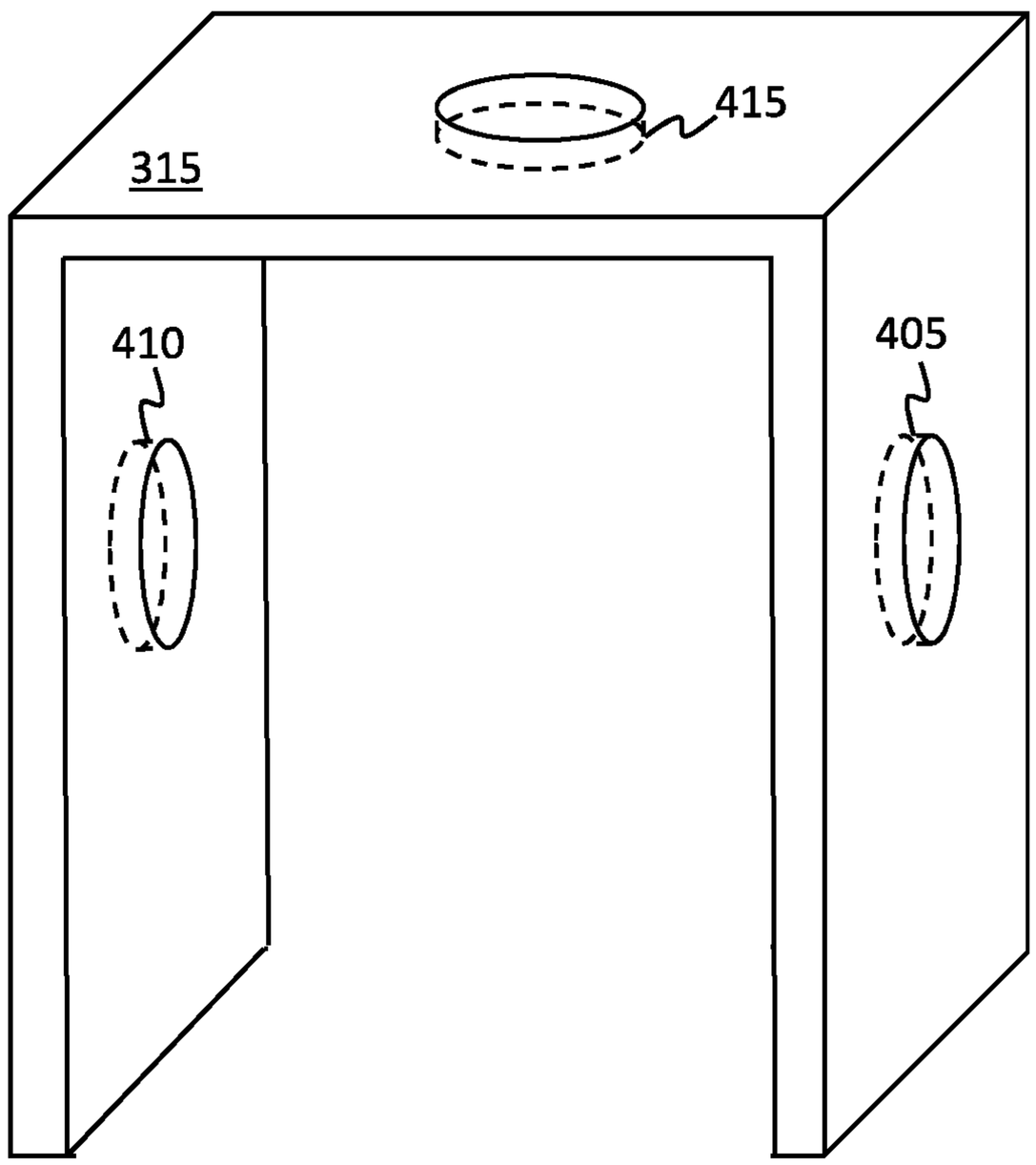


FIG. 4

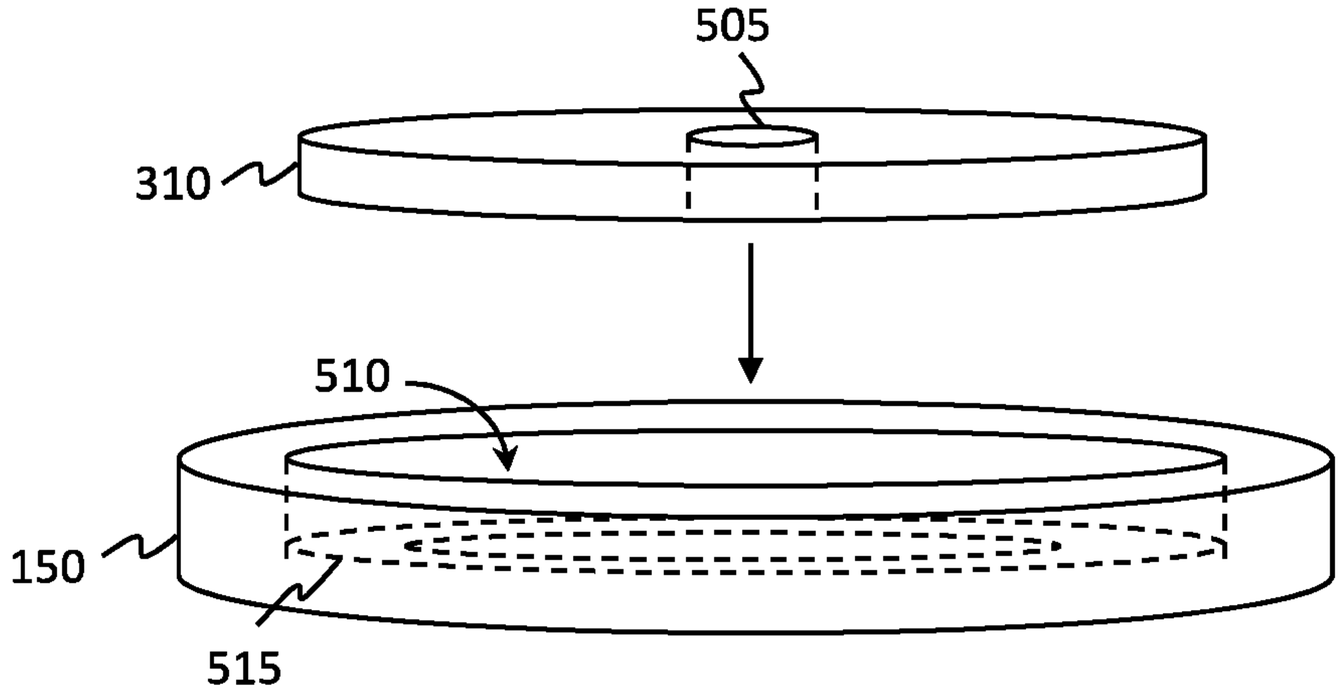


FIG. 5

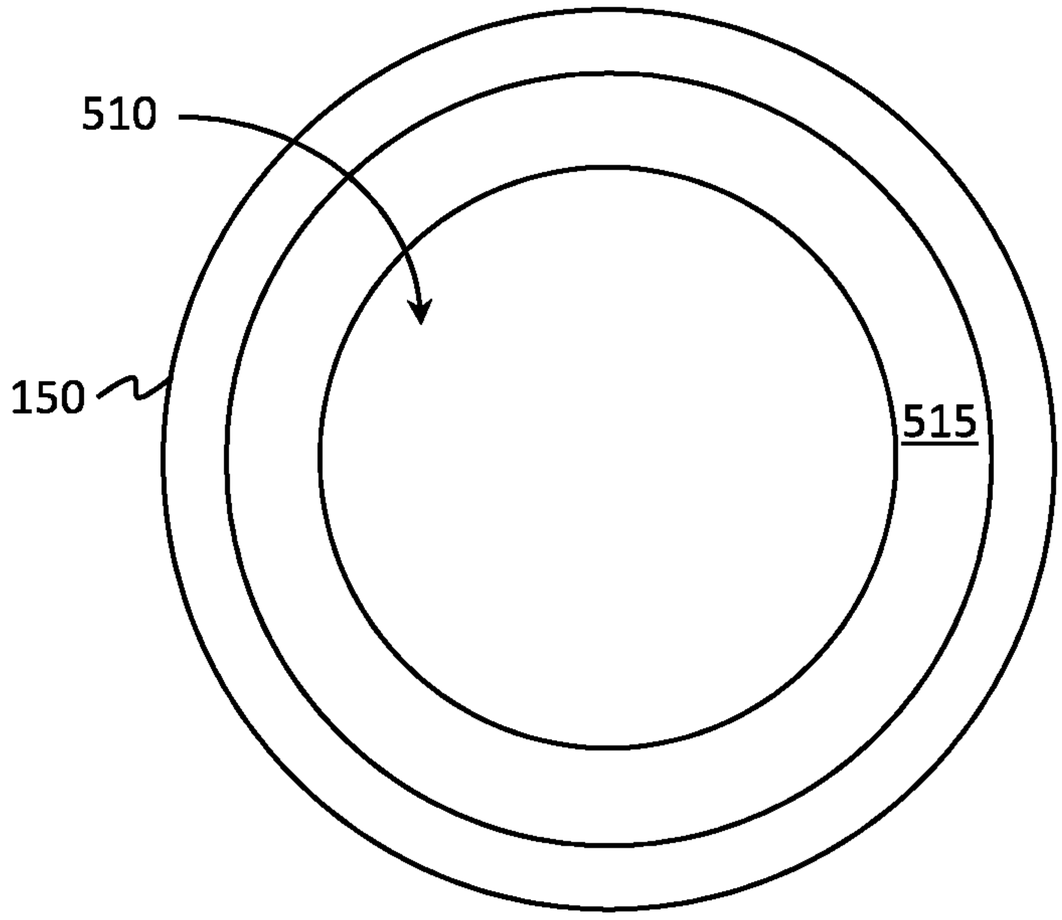


FIG. 6

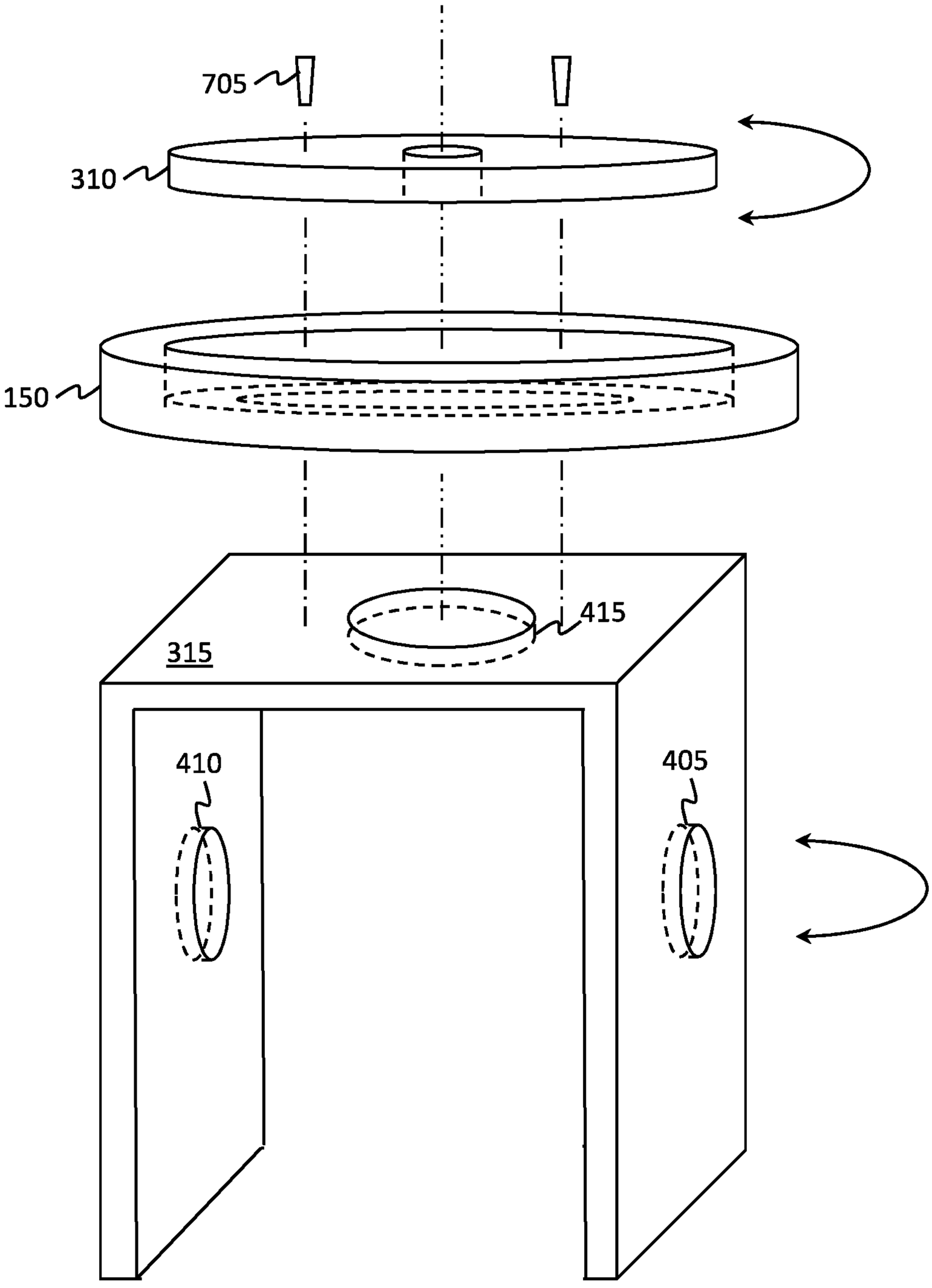


FIG. 7

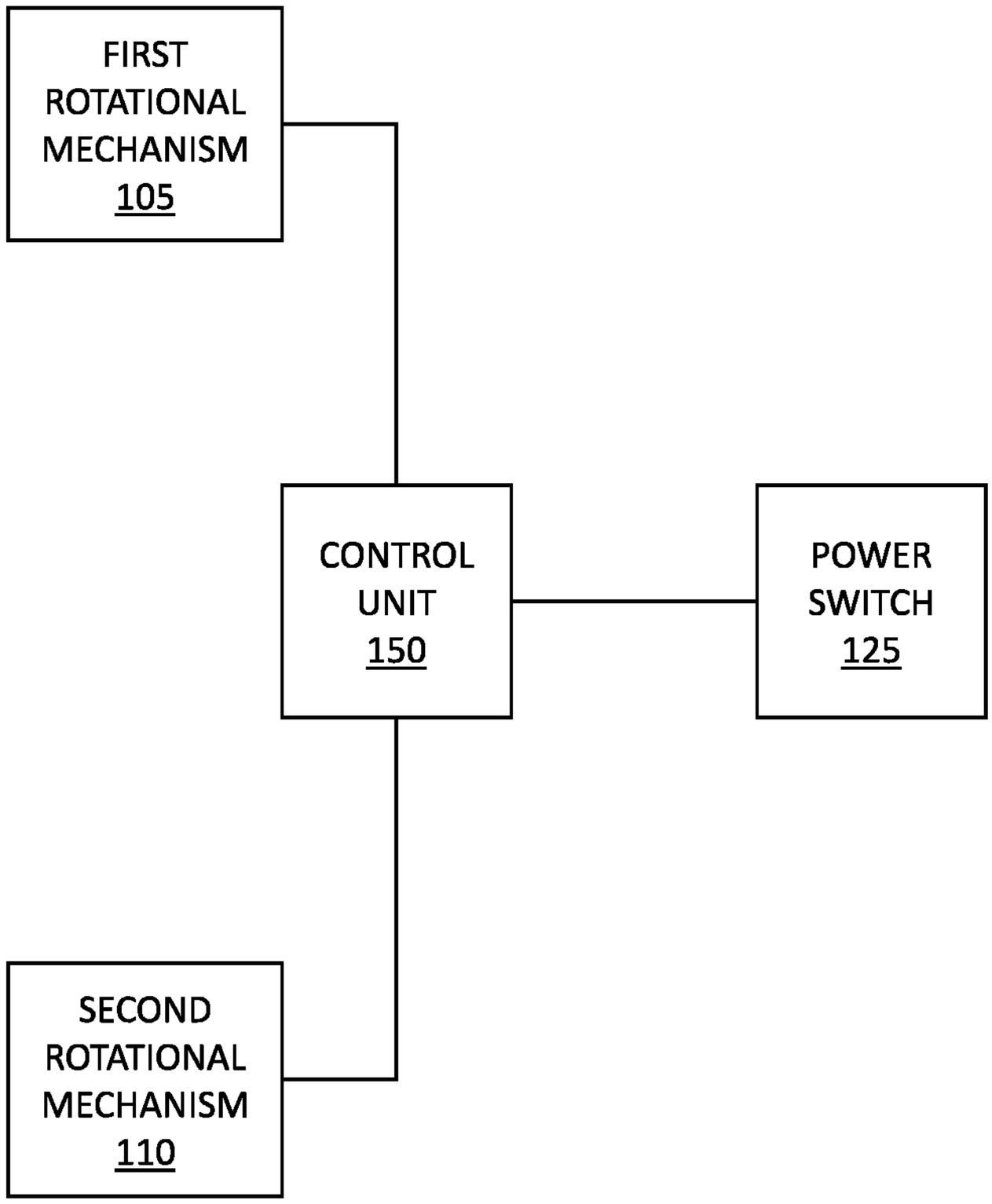

FIRST ROTATIONAL MECHANISM 105
CONTROL UNIT 150
POWER SWITCH 125
SECOND ROTATIONAL MECHANISM 110

FIG. 8

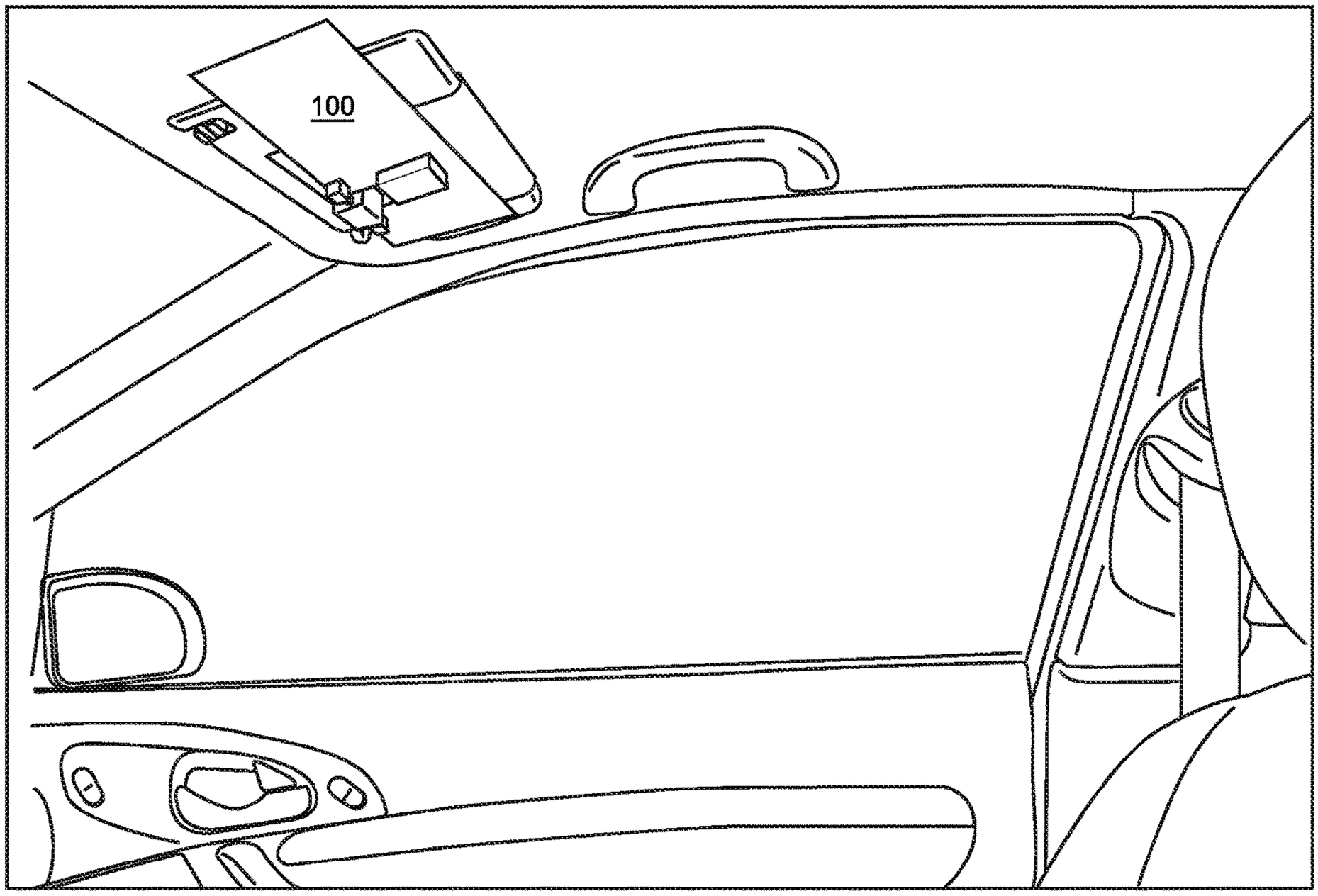


FIG. 9

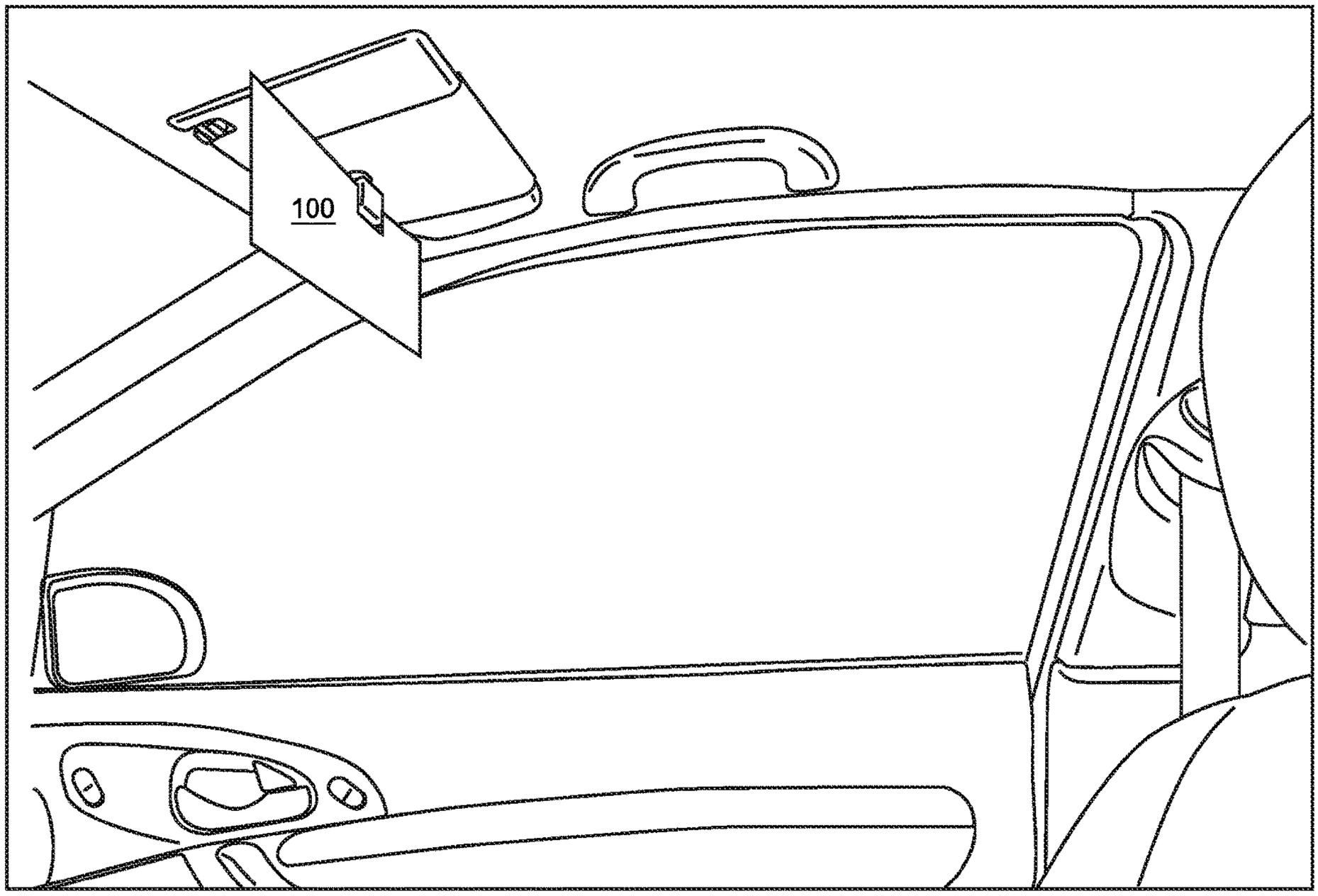


FIG. 10

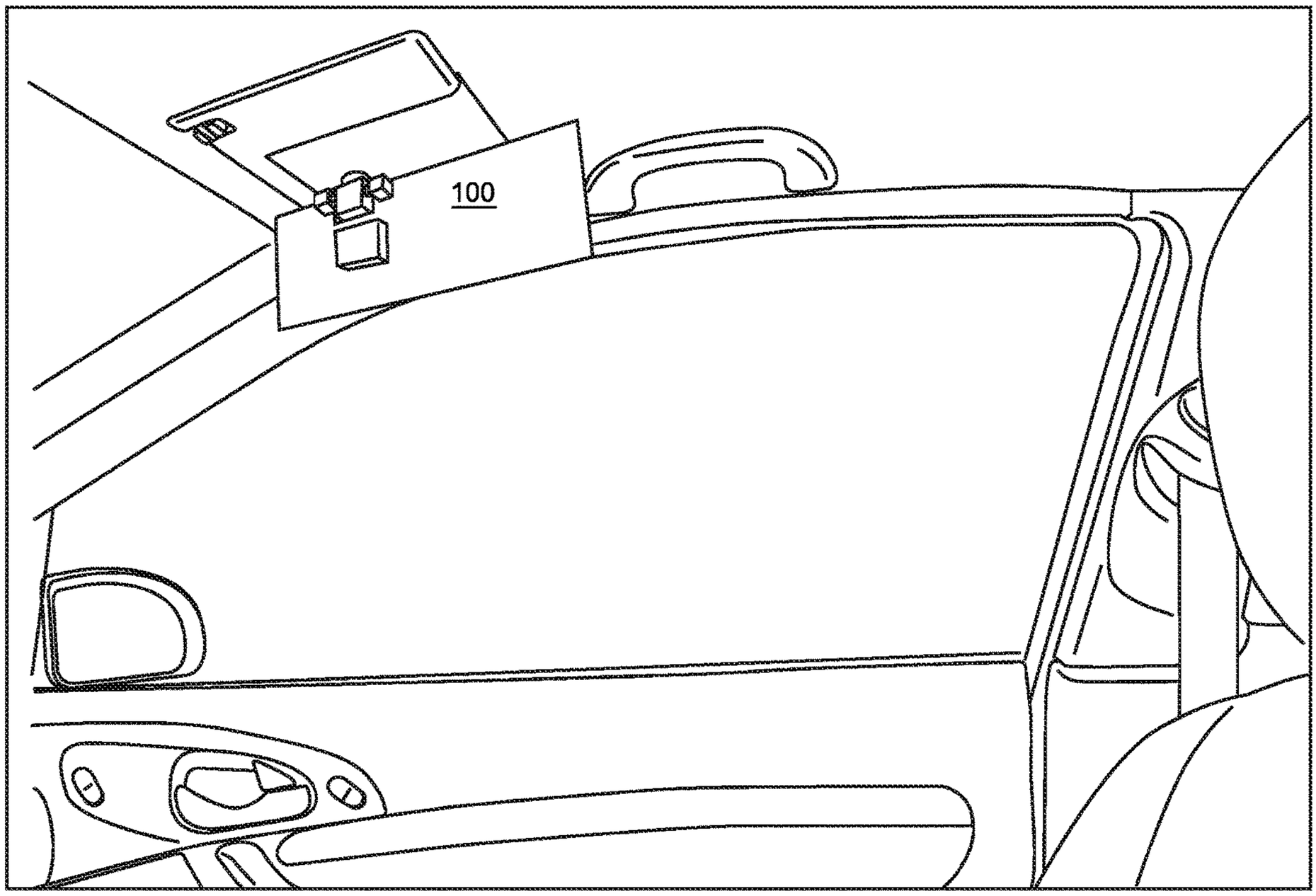


FIG. 11

REMOTELY OPERATED SUN VISOR

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 16/696,496 filed Nov. 26, 2019, which claims priority to U.S. Provisional Application No. 62/771,887 filed Nov. 27, 2018, which are hereby incorporated herein by reference.

FIELD OF THE INVENTION

The present disclosure relates generally to sun visors. More specifically, the present disclosure describes remotely operated sun visors.

BACKGROUND OF THE INVENTION

Driving in the sun may be an enjoyable experience, but it can also lead to a hazard if the driver's view is compromised by a glaring sun. This glare can make it much more difficult to see the road ahead and potential hazards, leading to an increased likelihood of accidents. Sun visor is an effective apparatus to protect the driver or front passenger from sun rays, such that the sun does not shine directly into the occupants' eyes. Almost every automobile is equipped with at least two sun visors that are positioned adjacent to a top portion of the windshield, one at the driver's side and another at the front passenger's side. Under certain lighting conditions, the driver may deploy the sun visor by rotating the sun visor about a rotational axis from a non-deployed position to a deployed position to prevent part of light transmission from entering the cabin, thereby enabling the driver to focus on vehicle operations.

However, the occupants have to manually move the sun visors up and down or from the front windshield to the side windows. This course of actions inevitably distracts the driver's attention and adversely influence the driving safety, especially when driving at a high speed. Meanwhile, the occupant is only allowed to easily manipulate the sun visor in front of him. For example, it is almost impossible for the driver who is driving to move the passenger side sun visor. Moreover, it may be difficult for tall drivers to manually manipulate the sun visor due to cramped space in the cabin.

BRIEF DESCRIPTION OF THE DRAWINGS

Some of the embodiments will be described in detail, with reference to the following figures, wherein like designations denote like members, wherein:

FIG. **1** illustrates a front view of a remotely operated sun visor in a first deployed state, according to some embodiments.

FIG. **2** illustrates a front view of the remotely operated sun visor in a second deployed state, according to other embodiments.

FIG. **3** illustrates internal components of a sun visor body of the remotely operated sun visor, according to certain embodiments.

FIG. **4** illustrates a perspective view of a motor housing, according to yet still others embodiments.

FIG. **5** illustrates a perspective view of a bearing and a bearing housing, according to some embodiments.

FIG. **6** illustrates a top view of a bearing housing, according to other embodiments.

FIG. **7** illustrates a perspective view of the assembly of the bearing, the bearing housing, and the motor housing, according to certain embodiments.

FIG. **8** illustrates a block diagram of electrical components of the remotely operated sun visor, according to yet still other embodiments.

FIG. **9** illustrates the remotely operated sun visor of FIG. **1** in a "stored state", according to some embodiments.

FIG. **10** illustrates the remotely operated sun visor in a "first deployed state", according to other embodiments.

FIG. **11** illustrates the remotely operated sun visor in a "second deployed state", according to certain embodiments.

Unless otherwise specifically noted, articles depicted in the drawings are not necessarily drawn to scale.

DETAIL DESCRIPTIONS OF THE INVENTION

As a preliminary matter, it will readily be understood by one having ordinary skill in the relevant art that the present disclosure has broad utility and application. As should be understood, any embodiment may incorporate only one or a plurality of the above-disclosed aspects of the disclosure and may further incorporate only one or a plurality of the above-disclosed features. Furthermore, any embodiment discussed and identified as being "preferred" is considered to be part of a best mode contemplated for carrying out the embodiments of the present disclosure. Other embodiments also may be discussed for additional illustrative purposes in providing a full and enabling disclosure. Moreover, many embodiments, such as adaptations, variations, modifications, and equivalent arrangements, will be implicitly disclosed by the embodiments described herein and fall within the scope of the present disclosure.

Accordingly, while embodiments are described herein in detail in relation to one or more embodiments, it is to be understood that this disclosure is illustrative and exemplary of the present disclosure, and are made merely for the purposes of providing a full and enabling disclosure. The detailed disclosure herein of one or more embodiments is not intended, nor is to be construed, to limit the scope of patent protection afforded in any claim of a patent issuing here from, which scope is to be defined by the claims and the equivalents thereof. It is not intended that the scope of patent protection be defined by reading into any claim a limitation found herein that does not explicitly appear in the claim itself.

Additionally, it is important to note that each term used herein refers to that which an ordinary artisan would understand such term to mean based on the contextual use of such term herein. To the extent that the meaning of a term used herein—as understood by the ordinary artisan based on the contextual use of such term—differs in any way from any particular dictionary definition of such term, it is intended that the meaning of the term as understood by the ordinary artisan should prevail.

Furthermore, it is important to note that, as used herein, "a" and "an" each generally denotes "at least one," but does not exclude a plurality unless the contextual use dictates otherwise. When used herein to join a list of items, "or" denotes "at least one of the items," but does not exclude a plurality of items of the list. Finally, when used herein to join a list of items, "and" denotes "all of the items of the list."

The following detailed description refers to the accompanying drawings. Wherever possible, the same reference numbers are used in the drawings and the following description to refer to the same or similar elements. While many embodiments of the disclosure may be described, modifi-

cations, adaptations, and other implementations are possible. For example, substitutions, additions, or modifications may be made to the elements illustrated in the drawings, and the methods described herein may be modified by substituting, reordering, or adding stages to the disclosed methods. Accordingly, the following detailed description does not limit the disclosure. Instead, the proper scope of the disclosure is defined by the appended claims. The present disclosure contains headers. It should be understood that these headers are used as references and are not to be construed as limiting upon the subjected matter disclosed under the header.

Other technical advantages may become readily apparent to one of ordinary skill in the art after review of the following figures and description. It should be understood at the outset that, although exemplary embodiments are illustrated in the figures and described below, the principles of the present disclosure may be implemented using any number of techniques, whether currently known or not. The present disclosure should in no way be limited to the exemplary implementations and techniques illustrated in the drawings and described below.

Unless otherwise indicated, the drawings are intended to be read together with the specification, and are to be considered a portion of the entire written description of this invention. As used in the following description, the terms "horizontal", "vertical", "left", "right", "up", "down" and the like, as well as adjectival and adverbial derivatives thereof (e.g., "horizontally", "rightwardly", "upwardly", "radially", etc.), simply refer to the orientation of the illustrated structure as the particular drawing figure faces the reader. Similarly, the terms "inwardly," "outwardly" and "radially" generally refer to the orientation of a surface relative to its axis of elongation, or axis of rotation, as appropriate. As used herein, the term "dorsal" refers to positions that are located near, on, or towards the upper or top side of a structure. As used herein, "vehicular sun visors" and "sun visors" are used interchangeably and refer to a shade affixed above the windshield of a vehicle.

The present disclosure includes many aspects and features. Moreover, while many aspects and features relate to, and are described in the context of detection of presence of one or more intruder devices, embodiments of the present disclosure are not limited to use only in this context.

Driving in the sun may be an enjoyable experience, but it can also lead to a hazard if the driver's view is compromised by a glaring sun. This glare can make it much more difficult to see the road ahead and potential hazards, leading to an increased likelihood of accidents. Sun visor is an effective apparatus to protect the driver or front passenger from sun rays, such that the sun does not shine directly into the occupants' eyes. Almost every automobile is equipped with at least two sun visors that are positioned adjacent to a top portion of the windshield, one at the driver's side and another at the front passenger's side. Under certain lighting conditions, the driver may deploy the sun visor by rotating the sun visor about a rotational axis from a non-deployed position to a deployed position to prevent part of light transmission from entering the cabin, thereby enabling the driver to focus on vehicle operations.

However, the occupants have to manually move the sun visors up and down or from the front windshield to the side windows. This course of actions inevitably distracts the driver's attention and adversely influence the driving safety, especially when driving at a high speed. Meanwhile, the occupant is only allowed to easily manipulate the sun visor in front of him. For example, it is almost impossible for the driver who is driving to move the passenger side sun visor. Moreover, it is difficult for a tall driver to manually manipulate the sun visor due to cramped space in the cabin.

The instant disclosure seeks to provide a remotely operated sun visor that can resolve one or more of the aforementioned issues. The present disclosure seeks to reduce or eliminate driver distractions that can occur with manually operated sun visors. Furthermore, the instant disclosure seeks to provide a seamless remote operation that allows drivers to easily access the operational power switch of the remotely operated sun visor and individually rotate the visor's body up, down, left, or right. The remotely operated sun visor can be deployed or actuated electrically and/or remotely to thereby substantially eliminate or reduce manual intervention at the initiation and termination of use. The remotely operated sun visor can be mounted on existing vehicular sun visors or function as a replacement of existing visors. In other words, the remotely operated sun visor can be mounted or pre-manufactured on to an automobile as a substitute for existing visors or retrofitted onto existing vehicular sun visors.

In reference to the general configuration of the instant disclosure, FIG. **1** illustrates a front view of a remotely operated sun visor (hereinafter "ROSV"), generally **100**, in a "first deployed state", according to some embodiments. The ROSV **100** is a motored sun visor that includes a first rotational mechanism **105**, a second rotational mechanism **110**, a sun visor body **115**, a controller unit **120**, and a power switch **125**. In addition to the deployed state disclosed in FIG. **1**, the ROSV also has a "stored state" where the sun visor body **115** is folded in towards the vehicle mounting bracket **145** (e.g., proximate to the top edge of the vehicle windshield) or towards the roof of the vehicle. For example, the vehicle mounting bracket **145** can be permanently (e.g., bolted on using fasteners) or dynamically coupled (e.g., using a clamp(s), Velcro, as well as other dynamic non-permanent fasteners) to a vehicular sun visor. In embodiments where the ROSV **100** replaces the vehicle sun visor, the vehicle mounting bracket **145** is affixed to the vehicle.

The first rotational mechanism **105** is preferably affixed to and oriented perpendicular to the second rotational mechanism **110**. The first rotational mechanism **105** and the second rotational mechanism **110** are electric motors. The first rotational mechanism **105** and the second rotational mechanism **110** are positioned within an enclosure **160**. The sun visor body **115** is torsionally coupled to the first rotational mechanism **105**, which thereby rotates the sun visor body **115** about a first axis **325** (discussed further below) when activated. The vehicle mounting plate **145** is torsionally coupled to the second rotational mechanism **110**, which thereby rotates the sun visor body **115** about a second axis **330** (discussed further below) when activated. FIG. **2** illustrates a front view of the ROSV **100** in a second deployed state, according to other embodiments.

The first axis **325** is oriented perpendicular to the second axis **330**. The first rotational mechanism **105** and the second rotational mechanism **110** are each communicatively coupled to the controller unit **120** (as depicted in FIG. **8**). FIG. **3** illustrates internal components of the sun visor body **115**, according to certain embodiments. The first rotational mechanism **105** and the second rotational mechanism **110** are each positioned within a motor housing **315**. The first rotational mechanism **105** and the second rotational mechanism **110** are perpendicularly coupled to each other. The first rotational mechanism **105** includes a first rod **130** and a second rod **135** positioned opposite the first rod **130**. The second rotational mechanism **110** includes a third rod **140**.

A visor drive mount **335** is coupled to the first rotational mechanism **105** opposite the first rod **130**. The second rod **135** is positioned within (e.g., rotatably coupled to) the visor drive mount **335**.

The second rod **135** is concentrically aligned with the visor drive mount **335**. The first rod **130**, the second rod **135**, and the third rod **140** each extend beyond the motor housing **315**. The first rod **130** and the second rod **135** are each coupled to and concentrically aligned with visor idler mounts **155**. The sun visor body **115** is coupled to the visor idler mounts **155**. The third rod **140** is torsionally coupled to the vehicle mounting bracket **145**. FIG. **4** illustrates a perspective view of the motor housing **315**, according to yet still others embodiments. The motor housing **315** includes an orifice **405**, an orifice **410**, and an orifice **415**. The first rod **130**, the second rod **135**, and the third rod **140** each extend beyond the orifice **405**, the orifice **410**, and the orifice **415**, respectively. FIG. **5** illustrates a perspective view of a bearing, generally **310**, and a bearing housing, generally **150**, according to some embodiments. The bearing **310** is preferably a planar disk-shaped component that includes a bearing orifice **505**. The bearing housing **150** is a structure that includes void space **510** and lip **515**. The bearing orifice **505** is concentrically aligned with the third rod **140** and the void space **510**.

The bearing **310** rests on the lip **515** when the ROSV is assembled. The bearing **310** is positioned in and rotates independent of the bearing housing **150**. FIG. **6** is a top view of the bearing housing **150** that shows the lip **515** and the void space **510**. The bearing **310** is positioned on the lip **515**, which provides structural integrity. FIG. **7** illustrates a perspective view of the assembly of the bearing **310**, the bearing housing **150**, and the motor housing **315**, according to certain embodiments. The bearing housing **150** is coupled to the vehicle mounting bracket **145**. The third rod **140** is coupled to a motor shaft adapter **305**, which is coupled to the vehicle mounting bracket **145**. The bearing **310** is positioned within the bearing housing **150**. The bearing **310** is preferably coupled to the motor housing **315** (e.g., via the fasteners **705**). The bearing **310** is concentrically aligned with the third rod **140** and the second rotational mechanism **110**. The bearing **310** rotates with motor housing **315** when the second rotational mechanism **105** is activated.

In reference to FIG. **8**, the controller unit **120** processes driver inputs that are received through the power switch **125** and outputs timing and control signals to the first rotational mechanism **105** and the second rotational mechanism **110**. The power switch **125** is an electronic unit that allows drivers to remotely operate the first rotational mechanism **105** and the second rotational mechanism **110**. In some embodiments, the power switch **125** is a separate unit that mounts to the control panel or dashboard of the vehicle. On other embodiments, the power switch **125** is integrated within the existing controls of the vehicle. In yet still other embodiments, the power switch **125** and/or the control unit **120** is electronically coupled to the vehicle's battery. FIGS. **9-11** illustrate the ROSV **100** in a "stored state", "first deployed state", and "second deployed state", according to certain embodiments,

Although the disclosure has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the spirit and scope of the disclosure.

What is claimed is:

1. A remotely operated sun visor, comprising:
- a first rotational mechanism;
- a second rotational mechanism;
- a sun visor body;
- a controller unit;
- a power switch;
- wherein
  - the first rotational mechanism is affixed to and oriented perpendicular to the second rotational mechanism;
  - the sun visor body is torsionally coupled to the first rotational mechanism which thereby rotates the sun visor body about a first axis when activated;
  - a vehicle mounting plate is torsionally coupled to the second rotational mechanism, which thereby rotates the sun visor body about a second axis when activated;
  - the first axis is oriented perpendicular to the second axis;
  - the first rotational mechanism and the second rotational mechanism are each communicatively coupled to the controller unit;
  - the first rotational mechanism and the second rotational mechanism are positioned within a motor housing;
  - the first rotational mechanism comprises a first rod and a second rod positioned opposite the first rod; and
  - the second rotational mechanism comprises a third rod.

2. The remotely operated sun visor of claim **1**, further comprising:
- a visor drive mount coupled to the first rotational mechanism opposite the first rod.

3. The remotely operated sun visor of claim **2**, further comprising:
- a motor housing; and
- wherein
  - the first rotational mechanism and the second rotational mechanism are each positioned within the motor housing.

4. The remotely operated sun visor of claim **3**, wherein
- the first rod, the second rod, and the third rod each extend beyond the motor housing.

5. The remotely operated sun visor of claim **4**, wherein
- the second rod is positioned within the visor drive mount.

6. The remotely operated sun visor of claim **5**, wherein
- the first rod and the second rod are each coupled to and concentrically aligned with a visor idler mount; and
- the sun visor body is coupled to the visor idler mounts.

7. The remotely operated sun visor of claim **6**, further comprising:
- a vehicle mounting bracket;
- a motor shaft adapter;
- wherein
  - the third rod is coupled to the motor shaft adapter; and
  - the motor shaft adapter is coupled to the vehicle mounting bracket.

8. The remotely operated sun visor of claim **7**, further comprising:
- a bearing housing; and
- wherein
  - the bearing housing is coupled to the vehicle mounting bracket.

9. The remotely operated sun visor of claim **8**, further comprising:
- a bearing positioned within the bearing housing;
- wherein
  - the bearing is coupled to the motor housing;
  - the bearing is concentrically aligned with the third rod and the second rotational mechanism; and
  - the bearing rotates with the motor housing when the second rotational mechanism is activated.

10. A remotely operated sun visor, comprising;
a first rotational mechanism;
a second rotational mechanism;
a sun visor body;
a controller unit;
a power switch;
wherein
the first rotational mechanism is affixed to and oriented perpendicular to the second rotational mechanism;
the sun visor body is torsionally coupled to the first rotational mechanism which thereby rotates the sun visor body about a first axis when activated;
a vehicle mounting plate is torsionally coupled to the second rotational mechanism, which thereby rotates the sun visor body about a second axis when activated;
the first axis is oriented perpendicular to the second axis;
the first rotational mechanism and the second rotational mechanism are each communicatively coupled to the controller unit;
the first rotational mechanism and the second rotational mechanism are positioned within a motor housing;
the first rotational mechanism comprises a first rod and a second rod positioned opposite the first rod; and
the second rotational mechanism comprises a third rod.

11. The remotely operated sun visor of claim **10**, further comprising:
a visor drive mount coupled to the first rotational mechanism opposite the first rod.

12. The remotely operated sun visor of claim **11**, further comprising:
a motor housing; and
wherein the first rotational mechanism and the second rotational mechanism are each positioned within the motor housing.

13. The remotely operated sun visor of claim **12**, wherein
the first rod, the second rod, and the third rod each extend beyond the motor housing.

14. The remotely operated sun visor of claim **13**, wherein
the second rod is positioned within the visor drive mount.

15. The remotely operated sun visor of claim **14**, wherein
the first rod and the second rod are each coupled to and concentrically aligned with a visor idler mount; and
the sun visor body is coupled to the visor idler mounts.

16. The remotely operated sun visor of claim **15**, further comprising:
a vehicle mounting bracket;
a motor shaft adapter;
wherein
the third rod is coupled to the motor shaft adapter; and
the motor shaft adapter is coupled to the vehicle mounting bracket.

17. The remotely operated sun visor of claim **16**, further comprising:
a bearing housing;
wherein
the bearing housing is coupled to the vehicle mounting bracket.

18. The remotely operated sun visor of claim **17**, further comprising:
a bearing positioned within the bearing housing;
wherein
the bearing is coupled to the motor housing;
the bearing is concentrically aligned with the third rod and the second rotational mechanism; and
the bearing rotates with the motor housing when the second rotational mechanism is activated.

19. A remotely operated sun visor, comprising;
a first rotational mechanism;
a second rotational mechanism;
a sun visor body;
a controller unit;
a power switch;
a visor drive mount coupled to the first rotational mechanism opposite the first rod;
a motor housing;
wherein
the first rotational mechanism is affixed to and oriented perpendicular to the second rotational mechanism;
the sun visor body is torsionally coupled to the first rotational mechanism which thereby rotates the sun visor body about a first axis when activated;
a vehicle mounting plate is torsionally coupled to the second rotational mechanism, which thereby rotates the sun visor body about a second axis when activated;
the first axis is oriented perpendicular to the second axis;
the first rotational mechanism and the second rotational mechanism are each communicatively coupled to the controller unit;
the first rotational mechanism and the second rotational mechanism are positioned within a motor housing;
the first rotational mechanism comprises a first rod and a second rod positioned opposite the first rod;
the second rotational mechanism comprises a third rod;
the first rotational mechanism and the second rotational mechanism are each positioned within the motor housing; and
the first rod, the second rod, and the third rod each extend beyond the motor housing.

* * * * *